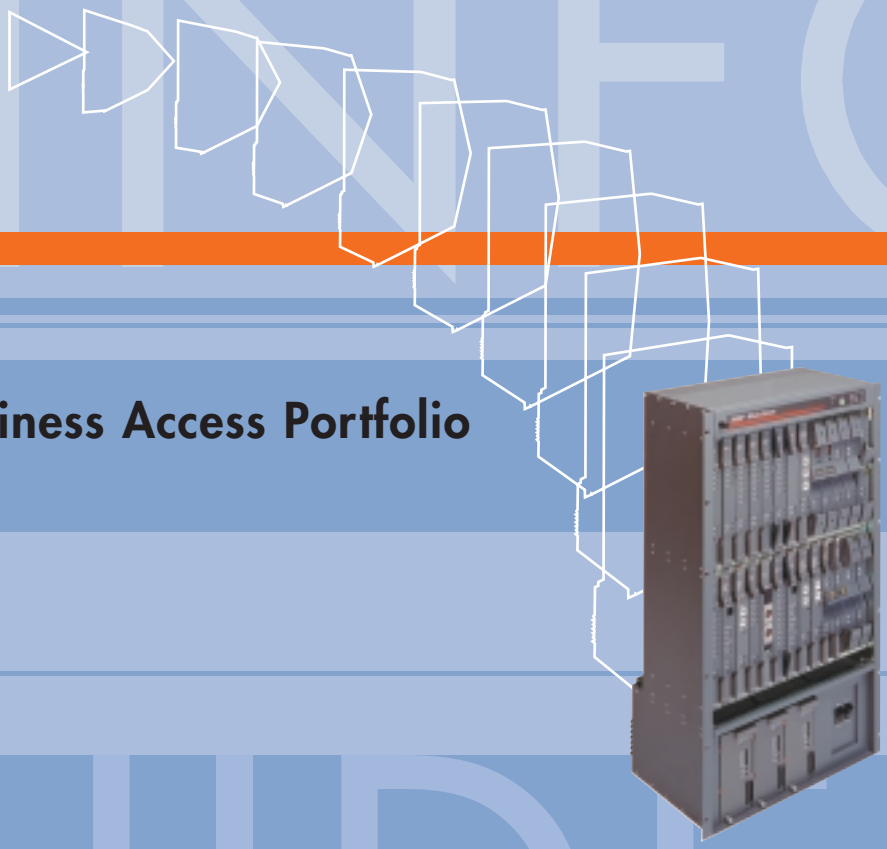
TECHNICAL INFORMATION GUIDE

MainStreet Business Access Portfolio



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Architecture

The information provided in this section is intended to provide a functional overview of each product. At the end of this section, you will find a table summarizing the applications supported and interfaces available for each product in the Alcatel MainStreet business access portfolio.

Multiservice Access Platforms (MAPs)

Alcatel 3600 MainStreet Multiservice Bandwidth Manager

The Alcatel 3600 MainStreet Multiservice Bandwidth Manager is a flexible, scalable and intelligent networking node that combines the functions of an integrated voice and data multiplexer, a frame relay and X.25 switch, a low capacity ATM access node, an intelligent channel bank, and a digital cross-connect switch. The Alcatel 3600 MainStreet Multiservice Bandwidth Manager accommodates network evolution and protects investment by enabling customers to integrate narrowband legacy services and broadband or IP-based networks.

The Alcatel 3600 MainStreet Multiservice Bandwidth Manager is ideal for access networks that support multiple TDM and packet/cell services, including:

- Packet/cell: ATM, frame relay, voice over frame relay (VoFR), X.25
- TDM: leased lines, voice, data, and voice compression

Offering a wide range of advanced business services, the Alcatel 3600 MainStreet Multiservice Bandwidth Manager is the most successful digital overlay platform ever built, with over 180,000 nodes installed worldwide, and growing.

The Alcatel 3600 MainStreet Multiservice Bandwidth Manager can be used:

- To concentrate circuit-switched, packet- and cell-based voice and data traffic
- To offer leased line services – from subrate to 2 Mb/s (*n**64 kb/s)
- As an international gateway, providing E1/T1, E3/T3 and ISDN interfaces with signaling and superate conversion, line and circuit grooming and voice compression
- As a low- to medium-capacity 3/0 and 1/0 digital access and cross-connect system (DACS)
- As an intelligent channel bank

Alcatel 3600+ MainStreet Multiservice Bandwidth Manager

The Alcatel 3600+ MainStreet Multiservice Bandwidth Manager builds on the highly successful architecture of the Alcatel 3600 MainStreet Multiservice Bandwidth Manager. It provides a scalable option to meet the increasing demand for multiple services and higher bandwidth on a single platform. In addition to offering all of the capabilities of the Alcatel 3600 MainStreet Multiservice Bandwidth Manager, the Alcatel 3600+ MainStreet Multiservice Bandwidth Manager offers fiber optic and electrical interfaces at STM-1/OC-3 speeds. It supports a wide range of circuit- and packet-based voice and data services, and is fully compatible with the Alcatel 3600 MainStreet Multiservice Bandwidth Manager, providing seamless integration into existing networks and protecting equipment investment.

The Alcatel 3600+ MainStreet Multiservice Bandwidth Manager is ideal for access networks that support multiple services, including packet and TDM with the requirement for connection to higher speed fiber optic backbones and metropolitan area networks/wide area networks (MANs/WANs).

The Alcatel 3600+ MainStreet Multiservice Bandwidth Manager supports a diverse set of access technologies including:

- Packet/cell: ATM, frame relay, voice over frame relay (VoFR), X.25
- TDM: leased lines, voice, data, and voice compression
- Synchronous optical network /synchronous digital hierarchy (SONET/SDH): linear interface (STM-1/OC-3), 1+1 interface (STM-1/OC-3), unidirectional path switched ring (UPSR) ring mode (STM-1/OC-3)

Alcatel 3600/Alcatel 3600+ MainStreet Multiservice Bandwidth Manager Enhancements

MainStreet Frame Relay

The Alcatel 3600 MainStreet Multiservice Bandwidth Manager and the Alcatel 3600+ MainStreet Multiservice Bandwidth Manager platforms offer extensive frame relay services. With the simple and cost-effective addition of a frame relay engine (FRE), packet engine (PE) or frame relay switch with Subrate Interface Module (FRS/SRIM) card, an Alcatel 3600/Alcatel 3600+ MainStreet node provides comprehensive frame relay switching capabilities.

MainStreet Frame Relay is a proven service used extensively in public and enterprise networks throughout the world. It can be used effectively in large or small networks that deploy frame relay alone, or in combination with leased line, X.25 and ATM services. Based on a modular architecture, up to 64 FRE and/or PE cards can be connected across the 100 Mb/s FASTbus to create a high capacity node that is capable of switching 120,000 fps.

MainStreet Frame Relay services include X.25/frame relay/ATM network and service interworking capabilities, subrate frame relay switching, and value-added service capabilities, such as VoFR with QoS, packet fragmentation and reassembly, and DLCI multiplexing.

An Alcatel 3600 MainStreet Multiservice Bandwidth Manager or Alcatel 3600+ MainStreet Multiservice Bandwidth Manager system that includes frame relay seamlessly interworks with the Alcatel 7470 MSP and the Alcatel 7670 RSP to provide an end-to-end frame relay solution — from the customer premises to the network core. These platforms are fully managed by the Alcatel 5620 NM allowing service providers to manage the multiservice environment from a single platform and console. New facilities can be added in seconds, rather than weeks, as more subscribers request service.

MainStreet ATM Service

The MainStreet ATM Service cards provide ATM service adaptation and inverse multiplexing over ATM (IMA) for the Alcatel 3600/Alcatel 3600+ MainStreet Multiservice Bandwidth Managers. Installed in any universal card slot (UCS), the ATM Service cards adapt the rich variety of Alcatel 3600/Alcatel 3600+ MainStreet Multiservice Bandwidth Managers supported services to ATM cells for transmission over an ATM network.

The ATM Service cards support AAL1 and AAL5 adaptation. The circuit emulation service (CES) adapts constant bit rate (CBR) traffic (n*64 kb/s) to AAL1 virtual circuits (VCs). The HDLC service adapts HDLC-formatted traffic into AAL5 VCs. The card has four E1 or T1 interfaces (physical ports). Each port provides a user network interface (UNI) to an ATM network and can function as an independent network link, or can be assigned to a logical IMA port for combined transmission.

Extending broadband ATM benefits to the Alcatel 3600/Alcatel 3600+ MainStreet Multiservice Bandwidth Managers, the ATM Services Card allows corporate networks to exploit rate differentials that favor ATM. The card's IMA capability is also a tremendous benefit where WAN connectivity requirements exceed E1/T1 capacity. The ATM Service card is optimized to support a single ATM aggregate comprised of one to four inverse multiplexed E1/T1 links.

Installing the ATM Services Card in Alcatel 3600/Alcatel 3600+ MainStreet Multiservice Bandwidth Managers increases network efficiencies, as operators manage only one logical "pipe" ranging from 1.5 Mb/s to 8 Mb/s, instead of parallel, discrete E1/T1 links.

By using the Alcatel 3600/Alcatel 3600+ MainStreet Multiservice Bandwidth Managers as close to the customer location as possible to adapt established and proven services to broadband, service providers are able to increase access to their ATM core infrastructures. The n* E1/T1 aggregate accommodates an infinite mixture of traffic types, and the ATM quality of service parameters ensure each traffic type is given and achieves the required service level.

MainStreet X.25 Service

The Alcatel MainStreet X.25 Service is a high-performance, feature-rich, standards-compliant X.25 product that is suitable for public switched data, large service providers, and corporate data networks. The system architecture enables advanced protocol encapsulation and conversion features. These include X.25/FR/ATM network and service interworking, all of which are supported on a single platform.

Alcatel MainStreet X.25 Service offers the following key benefits:

- Flexibility – the most flexible X.25 product available, offering seamless interworking with all other standards-based X.25 products and networks
- Versatility – supports X.25 and frame relay services simultaneously and interchangeably on the same card; ports can be reconfigured through software as service needs change
- Simplicity – unsurpassed installation, operation, using full graphical user interface (GUI)-based network management and software-driven configuration
- Scalability – each service — X.25, frame relay, TDM, integrated services digital network (ISDN), and ATM — can be individually introduced and scaled to cost-effectively meet the requirements of many network applications, reducing initial investment risk while maintaining linear cost per port as application demands increase
- Reduced Costs – significant cost savings can be achieved through consolidation of X.25 and other services on an integrated and fully managed MainStreet network

Alcatel 36110 MainStreet Multiprotocol Concentrator and Alcatel 36111 MainStreet High Capacity Multiprotocol Concentrator

The Alcatel 36110 MainStreet Multiprotocol Concentrator (MPC) offers a comprehensive suite of features that allow you to merge the user environment — synchronous and asynchronous terminals, system network architectures (SNAs), and local area networks (LANs) — with available high speed WAN communications services. The Alcatel 36111 High Capacity Multiprotocol Concentrator (HMPC) allows you to maintain current legacy applications, while taking advantage of high capacity network backbones. Both products support a wide range of protocols, including PAD, X.25 and SNA on the user side, and X.25 and frame relay in wide area networks (WANs).

Available in four chassis sizes (Alcatel MainStreet 36110 MPC: up to 8 and 20 ports, and Alcatel MainStreet 36111 HMPC: up to 24 and 80 ports), they are fully modular, providing flexible, secure access to your MainStreet network, and enabling you to take advantage of the availability of high speed connections offered by today's telecommunications operators.

The Alcatel 36110 MainStreet MPC and Alcatel 36111 HMPC also offer advanced routing, including IP and IPX, and ISDN adaptation. They are managed by the Alcatel 5620 NM, providing a common platform and interface for network and service management.

Integrated Access Devices (IADs)

Alcatel 3624 MainStreet Intelligent T1 Channel Bank

The Alcatel 3624 MainStreet Intelligent T1 Channel Bank (ICB) is a compact, sophisticated network access product that provides a cost-effective method of connecting voice and data devices such as telephones, private branch exchanges (PBXs), routers, bridges, personal computers and servers into a multiservice network.

The Alcatel 3624 MainStreet ICB supports any combination of:

- Voice
- Analog data from 2-wire and 4-wire modems
- Digital data

The Alcatel 3624 MainStreet ICB carries voice and data circuits over T1 transmission lines. It is ideal for customer premise T1 applications, in either point-to-point configuration or for access to public networks.

Seamless network management is provided through the Alcatel family of network management products. With its flexible interfaces, the Alcatel 3624 MainStreet ICB can mix voice and data traffic from virtually any combination of analog or digital devices onto a single T1 aggregate link.

The versatile Alcatel 3624 MainStreet ICB offers many applications, including:

- Voice, data, and integrated voice and data networking
- Point-to-network, point-to-point and feeder applications
- Fractional T1 applications
- Superate operation, providing connectivity for video conferencing, interconnecting LANs over the WAN, and Internet access
- Dataphone Digital Service (DDS) and Switched 56 network access
- Automatic and manual ringdown, including private line automatic ringdown (PLAR) to Foreign Exchange Office (FXO) service conversion
- Direct inward dialing (DID) access
- 2-wire and 4-wire analog data transmissions by modem

Alcatel 3630 MainStreet Primary Rate Multiplexer

The Alcatel 3630 MainStreet Primary Rate Multiplexer (PRM) serves as a customer premises gateway to multiservice networks for a wide range of equipment. The Alcatel 3630 MainStreet PRM is a high-performance, compact, intelligent T1 (1.544 Mb/s) or E1 (2.048 Mb/s) multiplexer, terminating up to 30 voice or data circuits.

It digitizes analog transmissions and integrates voice and data circuits for transmission on a primary rate link. The HDSL module enables E1 transmission rate over the local copper loop without the need for repeaters or generators. The manual ring down (MRD) module (North America) or GEN-GEN module (Europe) supports voice interfaces that are typically used by financial institutions for dealer room communication applications.

The Alcatel 3630 MainStreet PRM can be equipped with two T1 interfaces or two E1 interfaces. The second interface can be configured to provide protection switching and drop-and-insert capabilities. It supports the Alcatel 275x MainStreet IDSL DTUs, which allow for connections to multiple data devices up to 5.5 km away. The DTUs connect to the Alcatel 3630 MainStreet PRM over a single copper pair, thereby extending the reach of the Alcatel 3630 MainStreet PRM for distribution of services.

The Alcatel 3630 MainStreet PRM offers many applications, including:

- Voice, data, and integrated voice and data networking
- Point-to-point and drop/insert applications
- Superrate operation, providing connectivity for video conferencing, interconnecting LANs over the WAN
- Leased bandwidth delivery in the local loop

Alcatel 3612 MainStreet Narrowband Multiplexer

Designed to maximize bandwidth efficiency, the Alcatel 3612 MainStreet Narrowband Multiplexer (NBM) reduces networking costs while delivering high-performance services that are required for today's business applications. It manages expensive access link bandwidth through the use of voice compression, which provides high quality at very low bit rates, as well as frame relay switching and encapsulation. It also offers subrate multiplexing features to further improve bandwidth utilization.

The system can support various combinations of voice and high/low speed data, including connections from LAN routers and up to 24 analog or digital connections. Maximum bandwidth efficiency is realized with dynamic bandwidth allocation by sharing bandwidth on demand between voice, fax and data.

Alcatel 3612 MainStreet NBM highlights:

- Bandwidth savings through efficient multiplexing of voice, fax and data over leased line, frame relay and ISDN services from remote locations
- Highly flexible access feeder to multiservice networks
- Central hub for smaller star networks or point-to-point applications
- Combination of LAN, legacy data (Async, X.25, SNA, etc.) and voice over frame relay (VoFR) enables substantial bandwidth savings and performance improvements across the WAN
- Use of sophisticated low bit rate voice compression techniques delivers high-quality voice (and fax) communications while minimizing use of costly bandwidth
- Encapsulation into frame relay of PBX CCS signaling protocols provides significant bandwidth savings and provides PBX feature transparency
- Automatic aggregate protection of leased lines over the switched ISDN network negates the need for expensive, and often idle, alternate bandwidth for rerouting.
- Flexible ISDN features allow provision of temporary switched connections for disaster recovery applications

Network Termination Units (NTUs)

Alcatel 2902 MainStreet Network Termination Unit

The Alcatel 2902 MainStreet Network Termination Unit (NTU) delivers managed bandwidth access of up to 2 Mb/s over existing copper pairs (HDSL) or E1 facilities. Within a single unit, service providers can deliver integrated data and digital voice access with a high degree of flexibility and reliability, while making use of existing network infrastructure.

The Alcatel 2902 MainStreet NTU can be configured to deliver n*64 kb/s to 2 Mb/s voice and data services over two regular twisted copper pairs up to 5 kilometers (3.1 miles), without requiring repeaters.

The Alcatel 2902 MainStreet NTU allows service providers to multiplex data, router and LAN hub traffic into a single, versatile gateway. It provides a flexible, cost-effective way to integrate digital voice and data traffic from a business site onto a high speed E1 digital link for customer access to public or private networks, or for point-to-point operation.

Alcatel 2801 MainStreet HDSL Data Termination Unit

The Alcatel 2801 MainStreet HDSL Data Termination Unit (DTU) is an industry-leading access product that is ideal for providing high speed services from a central site to remote locations. This product offers secure, high-reliability service over private or leased lines, making it the choice of many carriers and enterprise customers worldwide.

The Alcatel 2801 MainStreet HDSL DTU provides a simple and economical vehicle to deliver data services at speeds of up to 1 Mb/s over a single pair, or up to 2 Mb/s over two pairs of unconditioned copper wires. Alcatel 2801 MainStreet HDSL DTU provides numerous advantages, including increased speed, increased distance without the need for repeaters, and improved reliability. It is unaffected by bridge taps and changes in wire gauge. It is fully managed by the industry leading Alcatel 5620 NM.

The Alcatel 2801 MainStreet HDSL DTU is excellent for applications such as high speed LAN interconnection, high speed extranet and intranet connections, and server connections for web hosting.

Alcatel 275x MainStreet IDSL DTUs

The Alcatel 275x MainStreet IDSL DTUs are used in many applications that require secure, highly reliable, low speed data such as automatic banking machines, lottery terminals, low speed router traffic, and alarm monitoring applications. The Alcatel 275x MainStreet IDSL DTUs are ideal products for extracting maximum performance from existing installed copper facilities.

Alcatel 275x MainStreet IDSL DTUs offer an attractive solution for providing services of up to 128 kb/s to remote sites. They are ideal for providing services from a central site to remote locations over existing twisted pair copper lines. These products also provide secure, high reliability service over private or leased lines with the added reliability of redundancy for mission-critical applications.

These products are fully managed by the Alcatel 5620 NM, enabling easy end-to-end path provisioning.
Three types of Alcatel 275x MainStreet IDSL DTUs are available:

- Alcatel 2751 MainStreet DTU with TIA/EIA-232 user ports
- Alcatel 2752 MainStreet DTU with X.21 user ports
- Alcatel 2753 MainStreet DTU with V.35 user ports

All three Alcatel 275x MainStreet IDSL DTUs share a common network port and can be mixed and matched on the same 6- and 12-port line cards. Subrate (<64 kb/s) data is supported and can be multiplexed onto the same DS0. This multiplexing of data allows for efficient utilization of bandwidth and real cost savings. Both the 6- and 12-port line cards can be installed in the Alcatel 3600/Alcatel 3600+ MainStreet Multiservice Bandwidth Managers.

Alcatel 2704 MainStreet V.110 DTU

The Alcatel 2704 MainStreet V.110 DTU is focused specifically at end user applications requiring V.110 rate adaptation. It supports a maximum loop of 7.2 km (4.5 mi.) and offers maximum data port speed of 64 kb/s, and port density of six circuits per slot.

Table 3: Alcatel MainStreet Business Access Portfolio Applications, Architecture and Interfaces

Product category	MAP				IAD			NTU			
Products	3600	3600+	36110	36111	3624	3630	3612	2902	2801	275x	2704
GOVERNMENT APPLICATIONS											
Regional government	•	•	•	•	•	•	•	•	•	•	•
Lottery	•	•			•	•					
Education networks	•				•	•	•	•			
Integrated communications solutions	•				•	•	•	•			
Multiservice consolidation	•				•	•	•	•			
FINANCIAL APPLICATIONS											
Financial dealer boards	•	•			•	•	•				
X.25	•	•	•							•	
Leased line/private line	•	•	•	•	•	•	•	•	•	•	•
Branch office networking	•		•	•	•	•	•	•			
Voice and data convergence	•	•			•	•	•	•			
UTILITIES APPLICATIONS											
Regional government variation	•	•			•	•	•	•	•	•	•
Metro optical	•	•				•	•	•			
Surveillance and telemetry	•		•	•	•	•	•	•			
Linear add/drop networks	•	•				•	•	•			
SERVICE PROVIDER APPLICATIONS											
Private line	•	•	•	•	•	•	•	•	•	•	•
Metro optical		•									
Consolidated X.25 networking	•	•	•	•							
Mobile aggregation, billing and backbone networks	•	•									
Enterprise access services	•	•	•	•	•	•	•	•			
Voice and data convergence over frame relay	•	•					•				
Flexible SME/MTU access distribution and aggregation	•	•	•	•	•	•	•	•	•	•	•
Leased line	•	•	•	•	•	•	•	•	•	•	•
SS7 signaling transport	•	•									
Add/drop multiplexing	•	•				•	•	•			
Digital access and cross-connect (DACS)	•	•									
Business-class xDSL access	•	•			•	•	•	•	•	•	
ATM access	•	•									
Frame relay switching			•	•			•				
Cellular base station aggregation and grooming	•	•				•					
Billing (CDR) and OAM message transport	•	•									
Voice and data convergence	•	•			•	•	•	•			
Voice compression	•	•					•				
Managed data services	•	•	•	•	•	•	•	•	•	•	•
Legacy protocol concentration			•	•							
Data network consolidation	•	•	•	•	•	•	•	•	•	•	•
GENERAL (MAXIMUM)											
# of universal card slots	128	16									
# of E1 ports	256	128				2					
# of T1 ports	256	128			1	2					
# of E3 ports	16										
# of T3 ports	8	3									
# of circuits					24	30	24				
Maximum speed								2048 Mb/s	2048 Mb/s	128 kb/s	128 kb/s
AGGREGATE INTERFACES											
1.544 Mb/s T1 (D4, ESF, 64 kb/s chan.)	•	•			•	•					
DS3	•	•									
E3	•										
2.048 Mb/s E1 (CAS, CCS, 64 kb/s chan.)	•	•				•	•	•			
X.21 PRI	•	•					•				
V.35 PRI	•	•					•				
E1 HDSL	•	•				•		•			
S/T BRI	•	•					•				
U BRI	•	•				•					
X.21			•	•							
V.35			•	•							
Optical extension E1	•	•				•		•			

Product category	MAP				IAD			NTU			
Products	3600	3600+	36110	36111	3624	3630	3612	2902	2801	275x	2704
VOICE INTERFACES											
T1 (D4 and ESF formats)	•	•			•	•					
E1 CAS and CCS, R2D (E&M)	•	•				•	•	•			
E&M	•	•			•	•	•				
4WTO	•	•			•						
2WTO					•						
FXS (LGS)	•	•			•	•	•				
FXO (LGE)	•	•			•	•	•				
MRD	•	•			•	•	•				
U BRI	•	•			•						
GEN-GEN	•	•				•	•				
DATA INTERFACES											
RS422	•	•									
T1A/E1 A-232	•	•	•	•	•	•	•	•	•	•	•
E1 G.703	•	•				•	•	•			
Ethernet 10Base-T			•								
2B1Q (for NTU connections)	•	•			•	•	•	•			
OCU-DP	•	•			•	•					
DSO-DP	•	•									
X.21	•	•	•	•	•	•	•	•	•	•	
V.35	•	•	•	•	•	•	•	•	•	•	
Frame relay	•	•	•	•			•				
V.24, V.28, T1A/E1A-232-C			•	•							
X.21/V.11			•	•							
SONET/SDH											
SONET OC-3		•									
SDH STM-1		•									
DSP APPLICATIONS											
Voice compression											
8 and 16 kb/s HCV compression	•	•					•				
8 kb/s A-CELP (ITU-T Rec. G.729)	•	•					•				
16 kb/s LD-CELP (ITU-T Rec. G.728)	•	•					•				
ADPCM (ITU-T Rec. G.721) 32 kb/s	•	•					•				
G3 fax support V.17) over compressed voice (14.4 kb/s max.)	•	•					•				
Modem (v.32 bis) tones support over compressed (CELP) voice (14.4 kb/s)	•	•					•				
Subrate multiplexing	•	•					•				
Switching of compressed voice and data	•	•									
Echo cancellation (26 ms, G.165)	•	•					•				
Voice conference bridging	•	•				•					
Mu/A-law companding conversion	•	•									
Multidrop PCM data bridging	•	•				•	•				
1.460 (n*8 kb/s transparent) multiplexing	•	•									
High capacity multiplexing (HCM)	•	•			•	•	•	•			
DDS and X.50 rate adaptation	•	•			•	•					
PACKET SERVICES											
Frame relay switching	•	•	•	•			•				
Frame relay access device			•	•			•				
Subrate frame relay (DDS, X.50, HCM)	•						•				
Transparent HDLC encapsulation	•	•	•	•			•				
Voice over frame relay (FRF.11)	•	•					•				
QoS (X.146)	•	•					•				
Frame relay fragmentation (FRF.12)	•	•					•				
DLCI multiplexing (FRF.11)	•	•					•				
Frame relay/ATM network interworking (FRF.5)	•	•									
Frame relay/ATM service interworking (FRF.8)	•	•									
AAL1 and AAL5 adaptation	•	•									
Inverse muxing over ATM (IMA)	•	•									
X.25/FR network/service interworking	•	•									
X.25 SVC and PVC	•	•	•	•							
X.75 and X.75'	•	•									
Asynchronous PAD (X.3, X.28, X.29)			•	•							
Legacy protocols (SNA, SDLC/QLLC, BSC)			•	•							
PSTN switched access (X.32 and V.25bis)			•	•							
Centralized protocol tracing	•	•									

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